What is claimed is:

1. An image pickup apparatus for extracting a subject area from a picked-up image of a target object as a subject, comprising:

a space-frequency characteristic pattern irradiating section which irradiates a visible light which has passed through an optical filter having a predetermined space-frequency characteristic to said target object;

a camera for picking up said target object;

a difference image generating section which generates a difference image between a first image picked up by said camera when said visible light is irradiated from said space-frequency characteristic pattern irradiating section and a second image picked up by said camera when said visible light is not irradiated from said space-frequency characteristic pattern irradiating section;

a space-frequency domain transforming section which transforms said difference image generated by said difference image generating section to a space-frequency domain to acquire a space-frequency characteristic of each pixel of said difference image;

a space-frequency pattern collating section which collates said space-frequency characteristic of each pixel acquired by said space-frequency domain transforming section with said space-frequency characteristic of said optical filter; and

a subject image generating section which generates a subject image from which said subject area has been extracted based on a result of collation performed by said space-frequency pattern collating section.

2. The image pickup apparatus according to claim 1, wherein said optical filter has a space-frequency characteristic which localizes a power spectrum to a predetermined space-frequency when said difference image is transformed to said space-frequency domain.

3. The image pickup apparatus according to claim 2, wherein said optical filter is an optical filter whose visible light transparency rate changes in a sine wave form.

4. The image pickup apparatus according to claim 1, wherein said space-frequency domain transforming section transforms a difference image into the space-frequency domain by Fourier transform.

5. The image pickup apparatus according to claim 1, wherein said space-frequency domain transforming section transforms a difference image into the space-frequency domain by discrete cosine transform.

6. The image pickup apparatus according to claim 1, wherein said difference image generating section acquires first average brightness of said first image and second average brightness of said second image and determines, based on the first average brightness and the second average brightness, that said first image is an image picked up by said camera when said visible light is irradiated and said second image is an image picked up by said camera when said visible light is not irradiated.

7. An image pickup apparatus for extracting a subject area from a picked-up image of a target object as a subject, comprising:

a space-frequency characteristic pattern irradiating section for irradiating a visible light which has passed through an optical filter having a predetermined space-frequency characteristic to said target object;

a camera for picking up said target object;

a processor; and

a storage which stores a program to be executed by said processor,

wherein said processor:

generates a difference image between a first image picked up by said camera when said visible light is irradiated from said space-frequency characteristic pattern irradiating section and a second image picked up by said camera when said visible light is not irradiated from said space-frequency characteristic pattern irradiating section;

transforms said generated difference image to a space-frequency domain to acquire a space-frequency characteristic of each pixel of said difference image;

collates said acquired space-frequency characteristic of each pixel with said space-frequency characteristic of said optical filter; and

generates a subject image from which said subject area has been extracted based on a result of collation performed by said space-frequency pattern collating section.

8. The image pickup apparatus according to claim 7, wherein said optical filter is an optical filter whose visible light transparency rate changes in a sine form.

9. The image pickup apparatus according to claim 7, wherein said processor transforms a difference image into the space-frequency domain by Fourier transform to thereby acquire said space-frequency characteristic of each pixel of said difference image.

10. The image pickup apparatus according to claim 7, wherein said processor transforms a difference image into the space-frequency domain by discrete cosine transform to thereby acquire said space-frequency characteristic of each pixel of said difference image.

11. The image pickup apparatus according to claim 7, wherein said space-frequency characteristic pattern irradiating section includes:

said optical filter;

a light source which irradiates light to said target object via said optical filter; and

a light source controller which controls ON and OFF states of said light source, and informs said processor of whether said light source is in said ON state or said OFF state.

12. The image pickup apparatus according to claim 7, wherein said processor acquires first average brightness of said first image and second average brightness of said second image and determines, based on the first average brightness and the second average brightness, that said first image is an image picked up by said camera when said visible light is irradiated and said second image is an image picked up by said camera when said visible light is not irradiated.

13. A subject area extracting method for extracting a subject area from a picked-up image of a target object as a subject, comprising the steps of:

irradiating a visible light which has passed through an optical filter having a predetermined space-frequency characteristic to said target object;

generating a difference image between a first image picked up when said visible light is irradiated and a second image picked up when said visible light is not irradiated;

transforming said generated difference image to a space-frequency domain to acquire a space-frequency characteristic of each pixel of said difference image;

collating said acquired space-frequency characteristic of each pixel with said space-frequency characteristic of said optical filter; and

generating a subject image from which said subject area has been extracted based on a result of collation.

14. The subject area extracting method according to claim 13, wherein said optical filter is an optical filter whose visible light transparency rate changes in a sine wave form.

15. The subject area extracting method according to claim 13, wherein a difference image is transformed into the space-frequency domain by Fourier transform at a time of acquiring said space-frequency characteristic of each pixel of said difference image.

16. The subject area extracting method according to claim 13, wherein a difference image is transformed into the space-frequency domain by discrete cosine transform at a time of acquiring said space-frequency characteristic of each pixel of said difference image.

17. The subject area extracting method according to claim 13, wherein at a time of generating said difference image, acquiring first average brightness of said first image and second average brightness of said second image and determining, based on the first average brightness and the second average brightness, that said first image is an

image picked up when said visible light is irradiated and said second image is an image picked up when said visible light is not irradiated.

18. A program which makes a computer:

generate a difference image between a first image picked up when a visible light which has passed through an optical filter having a predetermined space-frequency characteristic is irradiated to a target object as a subject and a second image picked up when said visible light is not irradiated to said target object;

transform said generated difference image to a space-frequency domain to acquire a space-frequency characteristic of each pixel of said difference image;

collate said acquired space-frequency characteristic of each pixel with said space-frequency characteristic of said optical filter; and

generate a subject image from which said subject area has been extracted based on a collation result.

19. The program according to claim 18, wherein a difference image is transformed into the space-frequency domain by Fourier transform at a time of acquiring said space-frequency characteristic of each pixel of said difference image.

20. The program according to claim 18, wherein a difference image is transformed into the space-frequency domain by discrete cosine transform at a time of acquiring said space-frequency characteristic of each pixel of said difference image.

21. The program according to claim 18, wherein at a time of generating said difference image, said program makes the computer acquire first average brightness of said first image and second average brightness of said second image and determine, based on the first average brightness and the second average brightness, ined that said first image is an image picked up when said visible light is irradiated and said second image is an image picked up when said visible light is not irradiated.